2.0 Alternatives Including the Proposed Project

This EA discloses the affected environment and the environmental consequences of the proposed project and alternatives to determine if significant environmental effects would occur. Section 2.0 describes Western's proposed project, and other alternatives considered during scoping and the alternative development process. Alternatives discussed in this section include design and voltage alternatives that have been considered and eliminated from the EA analysis, as well as transmission routing alternatives and the No Action Alternative that are evaluated in the EA.

2.1 Description of the Proposed Project

2.1.1 General Description

Western owns, operates and maintains the CH-MM115-kV transmission line and the AU-CH115-kV transmission line. The CH-MM transmission line is approximately 146 miles long and extends between the Miracle Mile Substation, located near Seminoe and Kortes Dams in south-central Wyoming and the Cheyenne Substation, in Cheyenne, Wyoming. The AU-CH transmission line is approximately 35 miles long, and extends between the Cheyenne Substation and the Ault Substation in northern Colorado. The locations of the CH-MM and AU-CH transmission lines are shown on Figure 2.1-1. The CH-MM line crosses portions of Carbon, Albany and Laramie Counties, Wyoming, and the AU-CH transmission line passes through portions of Laramie County, Wyoming and Weld County, Colorado.

Western is proposing to rebuild the existing CH-MM and AU-CH 115-kV transmission lines as 230-kV transmission lines. Except for 6.6 miles of lattice steel 230-kV construction that was completed in 1992, the construction of the CH-MM 115-kV line was completed in 1939. The existing original copper conductor and wood H-frame structures have exceeded their expected service life and Western anticipates that cost effective maintenance of the line would not be possible after the next 8 to 10 years. Western's proposed project for the CH-MM rebuild project entails replacing the original transmission line and structures with new 230-kV structures, including both wood H-frame structures and single pole steel structures. The original copper conductor would be replaced with new aluminum "1272 ACSR" conductor. Western is proposing to install approximately 1017 230-kV wood H-frame structures along 134.8 miles of the CH-MM transmission line, from approximately 6.6 miles east of Miracle Mile Substation to Cheyenne, Wyoming. Installation of approximately 26 double circuit single pole steel structures is proposed along approximately 5.0 miles, through the City of Cheyenne to the Cheyenne Substation. As part of the proposed project, Western would also remove the existing 115-kV structures and conductor.

The AU-CH 115-kV line was also built in 1938-1939. Many of the wood H-frame structures used in the original construction of the transmission lines are still in use today, and are approaching, or have exceeded the end of their useful service life. As a consequence, the existing transmission lines are beginning to require increased amounts of maintenance to ensure worker safety and line reliability. Western is proposing to rebuild the AU-CH transmission line with 230-kV/115-kV double circuit single pole steel structures for approximately 32 miles, from the Cheyenne Substation to approximately 3 miles north of the Ault Substation. From this point, Western would utilize the existing Archer-Ault (ARH-AU) 230-kV lattice structures and conductors to the Ault Substation. As part of the AU-CH rebuild, Western would construct approximately 3 miles of new 115-kV transmission line, to the east of the Archer-Ault lattice structures. The 115-kV

transmission line would be installed on wood H-frame structures. In total, Western anticipates constructing approximately 166 single pole steel double-circuit 230-kV structures and approximately 24 wood H-frame 115-kV structures for the proposed AU-CH rebuild.

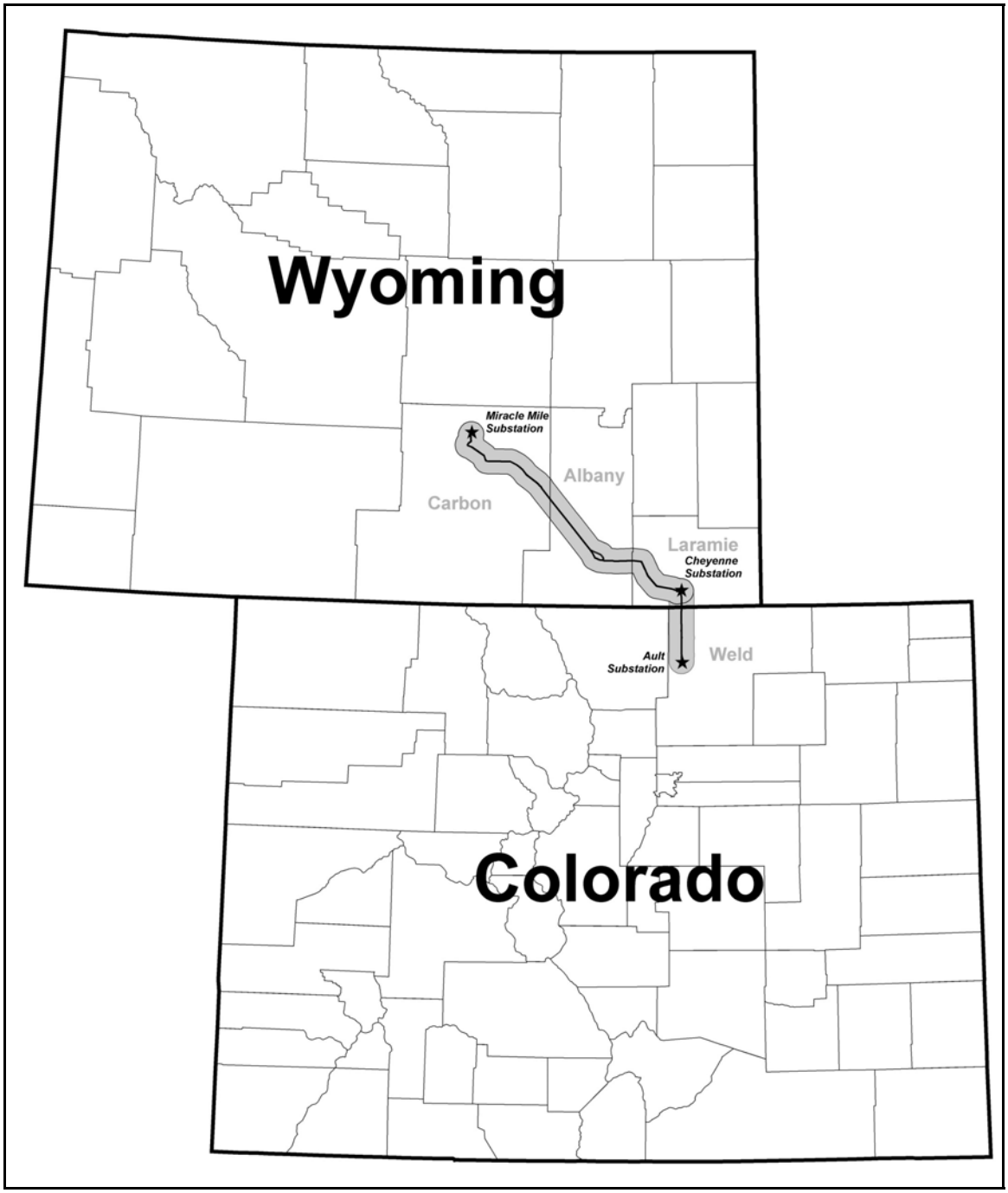

Figure 2.1-1 Locations of the CH-MM and AU-CH Transmission Lines

Western acquired ROWs for the CH-MM and AU-CH transmission lines when the lines were built in 1939 and 1938-1939, respectively. Western's ROWs for 115-kV transmission lines are typically 70- to 75-feet wide on average. The existing ROWs would be widened, as necessary, to

provide adequate electrical clearances for the proposed 230-kV and 230/115-kV transmission lines. Western would acquire expanded easements in accordance with applicable laws and regulations governing federal acquisition of property rights.

Western currently maintains access roads along the CH-MM and AU-CH 115-kV transmission line ROWs. These existing access roads would be used for constructing and maintaining the rebuilt CH-MM and AU-CH transmission lines. No new access roads are proposed. Minor improvements to existing roads and some new spur roads to specific structure sites may be required in rough terrain areas along the CH-MM transmission line.

The proposed project would also include a new substation in the Laramie area that would sectionalize the CH-MM and HJ-MM lines. The existing lines have been tapped a number of times over the years to serve rural loads in south central Wyoming, including the entire power requirements for the City of Laramie. The new sectionalizing substation would provide improved reliability to customers, by decreasing line exposure during outage situations. The proposed Snowy Range Substation would be a 115/230-kV sectionalizing substation, approximately 16 acres in size. Western is acquiring approximately 32 acres for the new substation site and the transmission line approaches into the substation. Construction of the 115-kV facilities would occur in 2007 followed by construction of 230-kV facilities in 2009. Western would also make modifications to the existing Miracle Mile, Cheyenne, and Ault Substations. All substation modifications would be within the existing fenced substation facilities.

2.1.2 Description of the Proposed Project By Transmission Line and Sections

The proposed CH-MM and AU-CH transmission lines are described below by section. Sections are defined as portions of the proposed transmission lines that would have the same structure design and ROW characteristics. Figure 2.1-2 shows the general location of each transmission section and Table 2.1-1 summarizes the proposed system design and ROW requirements. Appendix A of the EA contains detailed maps of the proposed project location, including the mileposts (MPs) referenced below. Typical cross-sections of the existing and proposed transmission designs and ROWs are contained in Appendix A, Figures A-1 through A-8.

CH-MM Transmission Line Rebuild

CH-MM Section 1 – Miracle Mile Substation to Milepost 6.6 – From the Miracle Mile Substation to MP 6.6 (structure 6/6), Western is proposing to use the existing lattice steel structures and transmission line conductor that was constructed in 1992 for the CH-MM 115-kV system. This section of the transmission line originates at the Miracle Mile Substation, and routes north and east of the Seminoe State Park in Carbon County, Wyoming. The CH-MM transmission line is the circuit to the west side of the existing HJ-MM line. When this segment of line was rebuilt in 1992, it was rebuilt with 230-kV, 954 ACSR conductor. Along Section 1, the proposed project would consist of uprating the CH-MM 115-kV line to 230-kV. Western's existing ROW is approximately 100 to 120 feet in width, and is adequate for the proposed 230-kV uprate. No construction or new facilities are proposed for Section 1 *(see Appendix Exhibit A-1 and Figure A-1).*

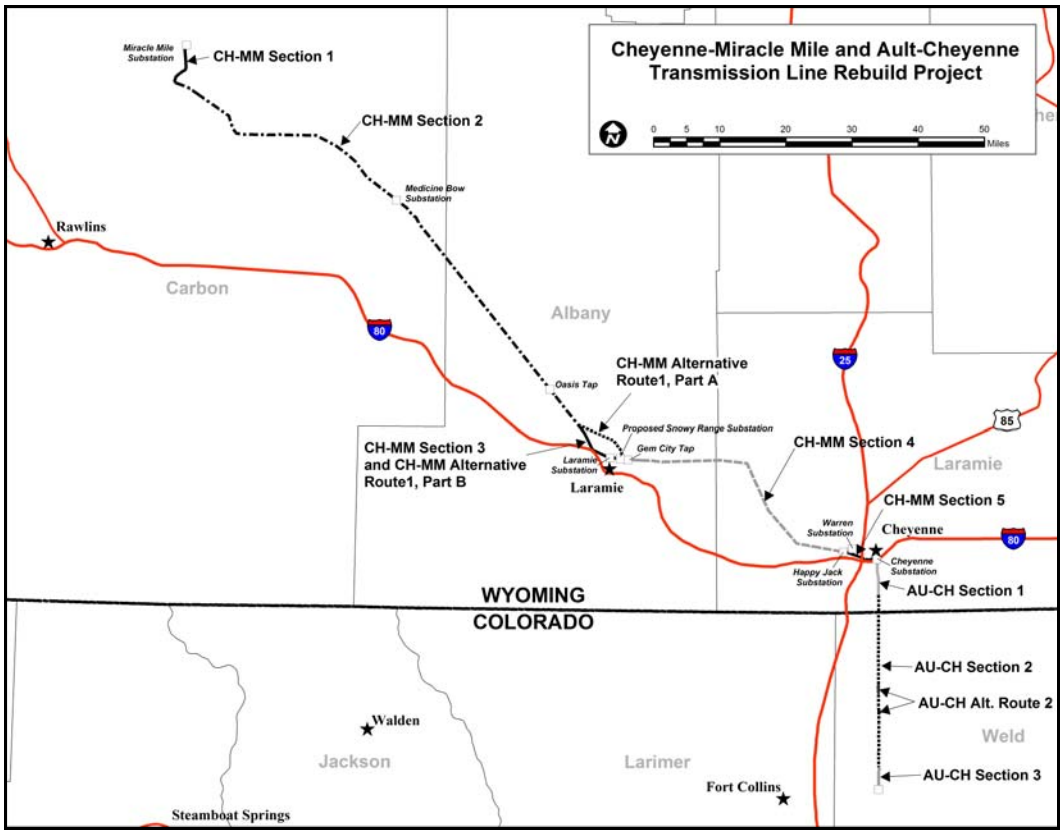

Figure 2.1-2 General Location of Each Transmission Section

Table 2.1-1. Typical Transmission Design – New Structures, Cheyenne-Miracle Mile and Ault-Cheyenne Rebuild Project

Description	Proposed 230-kV Transmission Structures	
	H-Frame Structures (CH-MM)	Double Circuit Single Pole Steel Structures (CH-MM and AU-CH)
Right-of-Way Width	105 feet	105 feet
Span between Structures (average)	700-800 feet	1,000 feet
Span between Structures (maximum)	1050 feet	1,200 feet
Number of Structures p/mile (average)	7.5	5.2
Height of Structures (average)	70 feet	115 feet
Height of Structures (typical range)	65-83 feet	85-135 feet
Structure base area (square feet)	37.5 sq. feet	20 sq. feet
Land disturbed by construction at each structure base (maximum square feet)	6,500 heavy disturbance 16,000 light disturbance	6,500 heavy disturbance 16,000 light disturbance
Miles of line per conductor stringing site	2-3 miles	2-3 miles
Land disturbed at each stringing site	1 acre 105 feet x 105 feet	1 acre 105 feet x 105 feet
Conductor type and size (circular mils)	ACSR (1,272,000)	ACSR (1,272,000)
Circuit Configuration	Horizontal	Vertical
Minimum ground clearance beneath conductors	25 feet	25 feet

Source: Western Area Power Administration

CH-MM Section 2 – Milepost 6.6 to Milepost 91.0 – Section 2 is approximately 84.4 miles in length, and crosses portions of Carbon and Albany Counties in south central Wyoming. Along Section 2, the CH-MM 115-kV transmission line parallels Western's HJ-MM 115-kV transmission line to the west and south. Western is proposing to replace the CH-MM existing 115-kV wood H-frame structures with new 230-kV wood H-frame structures. Western's existing ROW for the CH-MM line varies in width and overlaps portions of the HJ-MM ROW to the north and east. The CH-MM ROW would be increased to 105 feet *(see Appendix Exhibit A-2 and Figure A-2).*

CH-MM Section 3 – Milepost 91 to Milepost 100 – Section 3 begins at MP 91 , where Western's CH-MM and HJ-MM transmission lines diverge northwest of Laramie, Wyoming in Albany County. Section 3 is approximately 9 miles long, and terminates at the site of the proposed Snowy Range Substation (near MP 100) north of Laramie, Wyoming. Similar to Section 2, Western is proposing to replace the CH-MM 115-kV transmission line and wood H-frame structures with new 230-kV wood H-frame structures and transmission lines. Western's existing ROW is typically 70 to 75 feet wide and varies along the alignment. Western would expand the ROW width to 105 feet *(see Appendix Exhibit A-3 and Figure A-3).*

CH-MM Section 4 – Milepost 100 to Milepost 140 – Section 4 is east of the Snowy Range Substation and extends from the proposed Snowy Range substation site to MP 140, near Happy Jack Substation, 5.0 miles from the Cheyenne Substation. The existing Happy Jack Substation is approximately located at MP 140. Section 4 is approximately 40 miles long and passes through portions of Albany and Laramie Counties. Along this part of the proposed project, the CH-MM 115-kV transmission line routes north of, and parallel to, the HJ-MM 115-kV line. Both 115-kV lines are supported on separate wood H-frame 115-kV structures. Western is proposing to replace the CH-MM 115-kV wood H-frame structures with 230-kV H-frame structures. Western's ROWs

for the CH-MM vary, and average 70 to 75 feet in width. Western's combined ROWs for the CH-MM and HJ-MM lines are approximately 140 to 150 feet wide. Western's existing CH-MM ROW would be widened to approximately 105 feet. *(see Appendix Exhibit A-4 and Figure A-4).*

CH-MM Section 5 – Milepost 140 to Milepost 146.4, Cheyenne Substation – Section 5 is approximately 5.0 miles in length and extends from MP 140, in the vicinity of the Happy Jack Substation to the Cheyenne Substation. Section 5 traverses portions of unincorporated Laramie County, and the City of Cheyenne. Along this part of the proposed project, the CH-MM 115-kV transmission line routes north of, and parallel to, the HJ-MM 115-kV line. Both 115-kV lines are constructed on separate 115-kV wood H-frame structures. Western's ROW for the CH-MM varies, averaging 70 to 75 feet in width. Western's combined ROWs for the CH-MM and HJ-MM lines are approximately 140 to 150 feet wide. Along Section 5, Western is proposing to replace both the CH-MM and HJ-MM 115-kV wood H-frame structures with new double circuit 230/115-kV single pole steel structures. The CH-MM 230-kV circuit would be located on the north side of the structures and is planned to terminate in the Cheyenne Substation and connect with the AU-CH 230-kV line. The HJ-MM 115-kV circuit is located on the south side and would remain terminated in the Cheyenne Substation. The proposed project would require a ROW, approximately 105 feet in width. No additional ROWs would be necessary along this section, since the combined ROWs for the CH-MM and HJ-MM transmission lines would be adequate for the proposed double circuit 230/115-kV transmission lines *(see Appendix Exhibit A-5 and Figure A-5).*

AU-CH Transmission Line Rebuild

AU-CH Section 1 – Cheyenne Substation to Milepost 5.2 – From the Cheyenne Substation to approximately MP 5.2, Western presently owns and operates the AU-CH 115-kV transmission line. This section crosses portions of Laramie County, Wyoming and Weld County, Colorado. Western is proposing to rebuild the existing AU-CH 115-kV line that is currently supported on wood H-frame structures, with new double circuit 230/115-kV single pole steel structures. Western's existing ROWs would be expanded to approximately 105 feet to provide for adequate electrical clearances. The AU-CH 115-kV circuit would be located on the east side and the 230-kV circuit would be located on the west side *(see Appendix Exhibit A-6 and Figure A-6).*

AU-CH Section 2 – Milepost 5.2 to Milepost 32.0 – AU-CH Section 2 is approximately 27 miles in length, and located in Weld County, Colorado. Along AU-CH Section 2, the existing AU-CH 115-kV transmission line is located west of, and parallel to, Western's existing Archer-Ault (ARH-AU) 230-kV line. The ROW for the AU-CH transmission line averages 75 feet, and is located adjacent to the ARH-AU for most of this distance. Along AU-CH Section 2, Western is proposing to replace the AU-CH 115-kV wood pole structures with new double circuit 230/115-kV single pole steel structures. Western would widen the existing AU-CH ROW to approximately 105 feet *(see Appendix Exhibit A-7 and Figure A-7).*

AU-CH Section 3 - Milepost 32.1 to Milepost 35, Ault Substation – AU-CH Section 3 is approximately 3 miles long and terminates at the Ault Substation. This section is located in Weld County, Colorado. In this section, Western currently operates the AU-CH 115-kV and the ARH-AU 230-kV lines on double circuit lattice steel structures. The 115-kV circuit is located on the west side and the 230-kV circuit is located on the east side. Western's existing ROWs average 100 feet for the double circuit lattice structures. Along AU-CH Section 3, Western is proposing to uprate the existing 115-kV circuit on the ARH-AU lattice steel structures to 230-kV. Western is also proposing to relocate the existing 115-kV line to new wood H-frame structures, east of the existing lattice structures. Western would obtain ROWs approximately 105 feet in width east of

the existing lattice structures for the new 115-kV section of line. In combination with the ARH-AU 230-kV line, Western's ROWs width would be approximately 205 feet along AU-CH Section 3 *(see Appendix Exhibit A-8 and Figure A-8).*

2.1.3 Description of Proposed Transmission Facilities

Proposed Transmission Structure Designs

Western is proposing to rebuild the transmission facilities with 230-kV wood H-frame structures and double circuit single pole steel structures. Figure 2.1-3 depicts the 230-kV wood H-Frame structure, and Figure 2.1-4 illustrates the proposed double circuit single pole steel structure. Design characteristics of the proposed transmission structures are summarized on Table 2.1-1.

230-kV Wood H-Frame Structures – Wood H-frame structures would be installed along 134.8 miles of the CH-MM transmission line. The 230-kV H-frame structures would average 70 feet in height, and be approximately 18 feet taller than the existing 115-kV wood pole structures that they would replace. The width of the new H-frame structures would also be greater, with typical widths being 22 feet, compared to 12 feet for the existing H-frame structures. Normal span lengths between the proposed H-frame structures would be similar to the existing structures, averaging 700 to 800 feet apart.

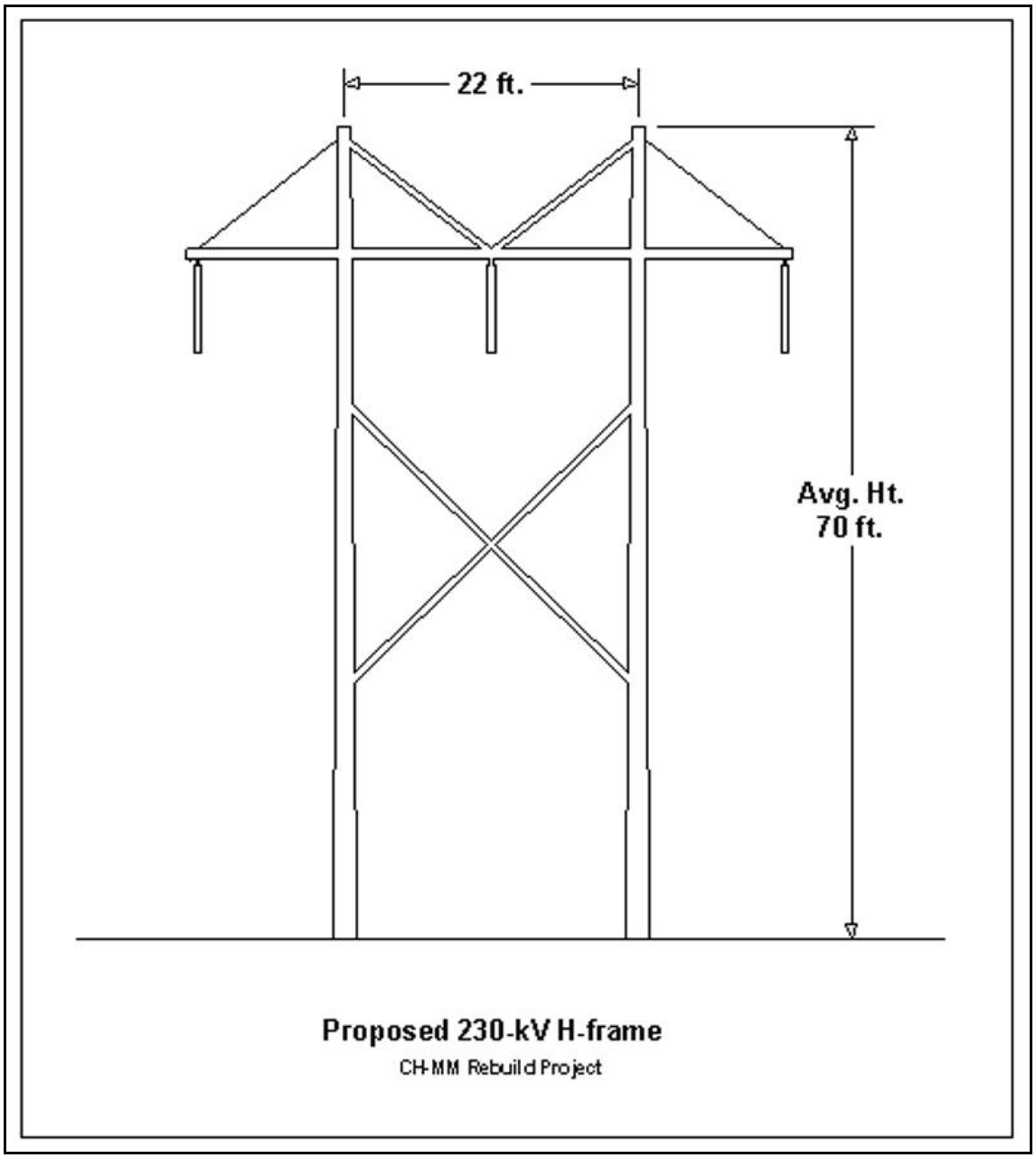

Figure 2.1-3 The 230-kV Wood H-Frame Structure

230-kV Double Circuit Single Pole Steel Structures – Western is proposing to install double circuit single pole steel structures along 5.0 miles of the CH-MM line and along 32 miles of the AU-CH line. The single pole steel structures would be approximately 115 feet in height, compared to 52 feet for the average height of the existing H-frame structures. The normal span length between the single pole steel structures would be 1000 feet, compared to 700 to 800 feet for the existing 115-kV wood H-frame structures. At the crossing of I-80, the single pole steel structures may need to be taller to provide adequate clearances over the interstate. Maximum heights for the proposed project at this crossing are estimated to be approximately 120 feet.

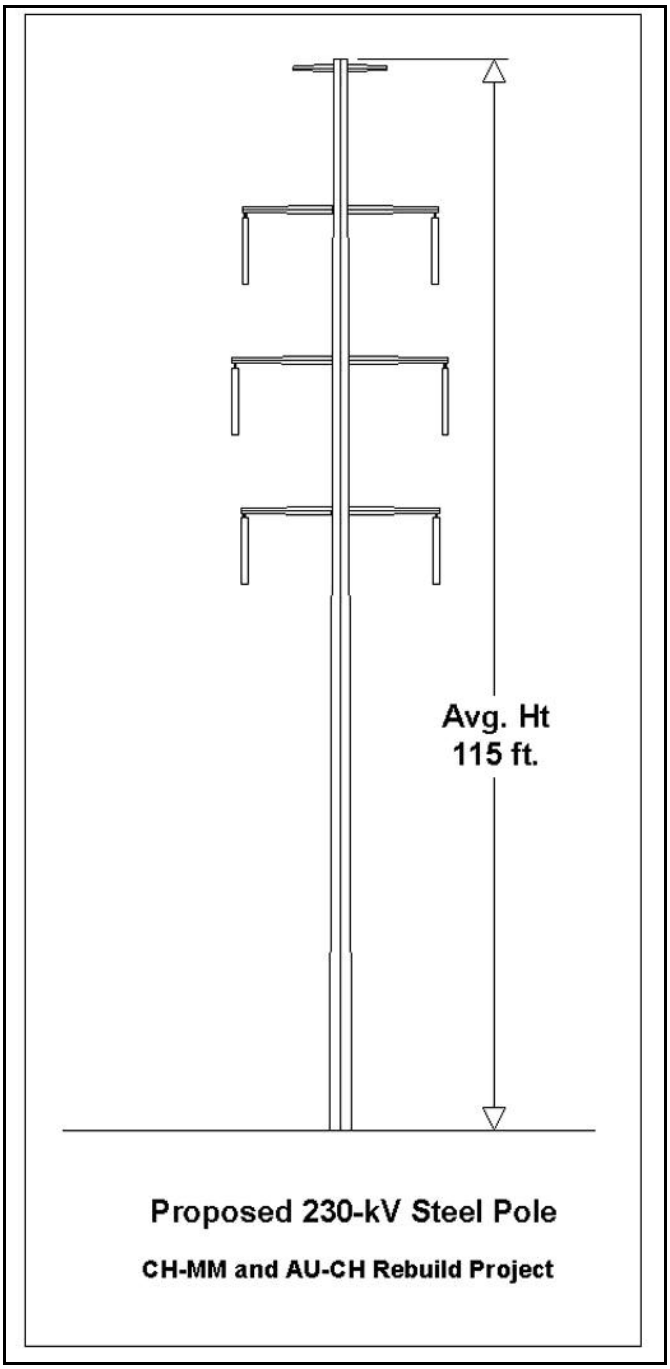

Figure 2.1-4 Proposed Double Circuit Single Pole Steel Structure

2.1.4 Proposed Right-of-Way Modifications

Upgrading the CH-MM and AU-CH transmission lines would occur along existing Western alignments. Western's existing ROWs across federal, state and privately owned lands vary, with typical ROWs being 70 to 75 feet in width. The National Electric Safety Code (NESC) sets standards for electrical clearances for safety purposes. Western proposes to widen the existing

CH-MM and AU-CH 115-kV ROWs to 105 feet in order to meet NESC electrical clearances for the proposed 230-kV transmission systems.

Additional ROWs would be required along most of the rebuild projects. Additional ROWs would not be necessary; however, along the following areas of the CH-MM rebuild project, where the easements are adequate for the proposed project: 1) the first 6.6 miles of the CH-MM transmission line (CH-MM Section 1), where the existing line and lattice structures would be uprated and no new construction would occur; and 2) from MP 140 to 146.4 (CH-MM Section 5) where Western's existing combined ROWs for the CH-MM and HJ-MM are adequate for the proposed double-circuit 230/115-kV single pole steel structures through the City of Cheyenne.

Western would acquire all additional ROWs necessary to meet NESC standards. Expanded and new easements would be acquired in accordance with applicable laws and regulations governing federal acquisition of property rights. These laws allow the payment of just compensation to landowners for the rights acquired and every effort would be made to acquire these rights by direct purchase.

2.1.5 Access Roads

Access to the proposed transmission structure sites and construction areas would occur along Western's existing roads and/or by overland construction methods. Western currently maintains access roads to the CH-MM and AU-CH transmission lines. These existing roads would be used to construct and maintain the proposed CH-MM and AU-CH Rebuild Project. Additional spur roads may be needed to access some new structure sites where vegetation and/or terrain conditions limit or restrict the movement of construction equipment and vehicles. These types of new access roads would be minor and needed only in areas characterized by rough terrain in the western part of the CH-MM project area. After construction is completed, access roads would be used on an occasional and periodic basis to access the transmission lines for routine and emergency maintenance activities.

2.1.6 Proposed Substation Facilities and Modifications

Proposed Snowy Range Substation

Western would construct a new Snowy Range Substation north of the town of Laramie near MP 100 of the CH-MM transmission line. The proposed Snowy Range Substation would be located east of 9th Street and west of N. 30th Street in Laramie. Western is acquiring 32 acres for the substation and transmission line approaches. The substation facility would be approximately 16 acres in size and is required for voltage and sectionalizing support. The substation equipment would consist of a three breaker 230-kV ring bus, one 200 MVA, 115/230-kV transformer and a six-bay 115-kV main and transfer bus. Construction of the 115-kV facilities would occur in 2007 followed by construction of 230-kV facilities in 2009. Figure 2.1-5 shows the location of the Snowy Range Substation.

Miracle Mile, Cheyenne and Ault Substation Modifications

Minor modifications would also be made to the existing Miracle Mile, Cheyenne and Ault Substations to support the proposed 230-kV transmission voltage. All substation changes would be within the existing fenced substation facilities. The Miracle Mile Substation additions would include two 230-kV line bays and one 200 MVA, 115/230-kV transformer. The Cheyenne

Substation additions would consist of a three-breaker 230-kV ring bus and one 200 MVA, 115/230-kV transformer. The Ault Substation would be modified to add one 230-kV line bay.

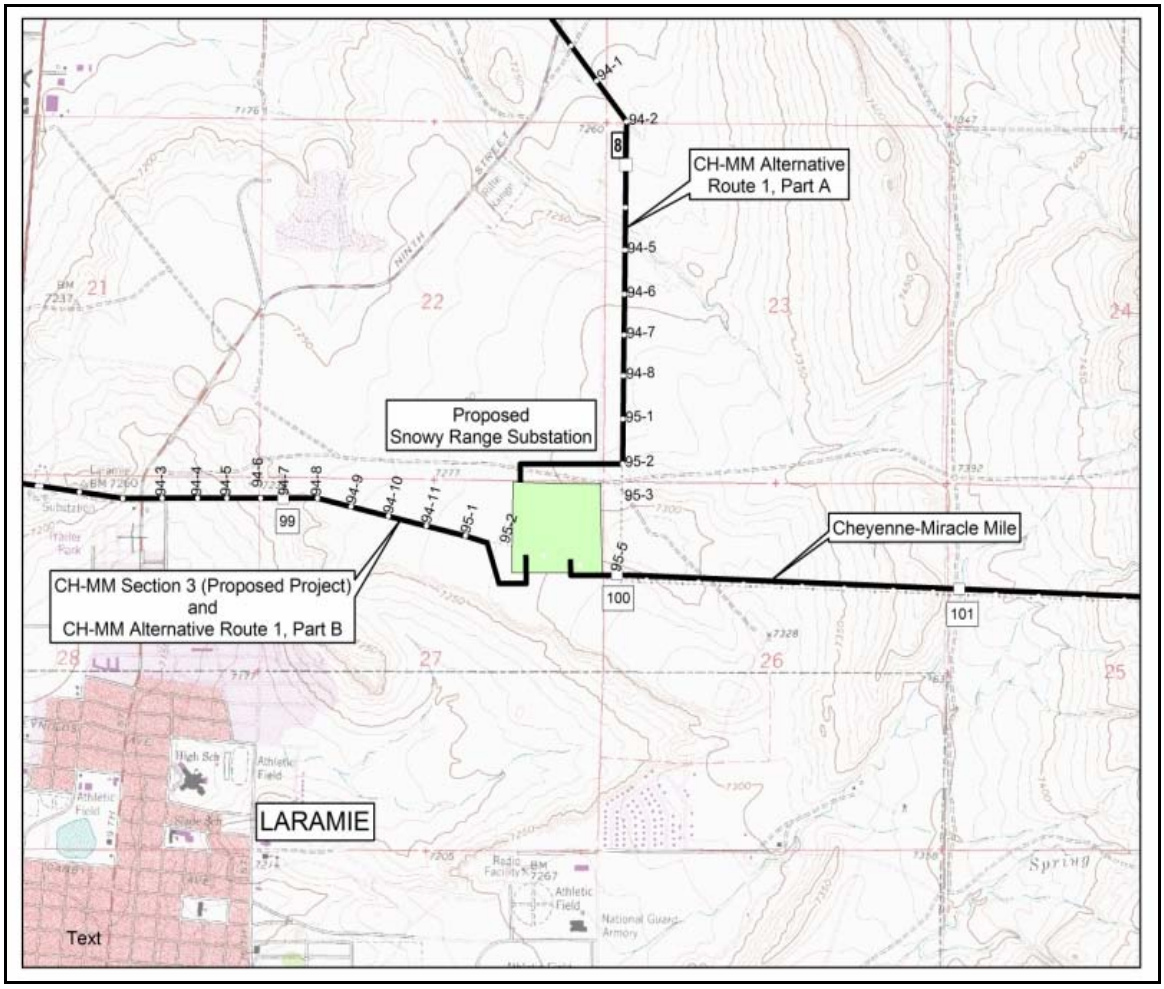

Figure 2.1-5 Location of the Snowy Range Substation

2.1.7 Construction Practices

Construction Schedule

Western plans to construct the CH-MM and AU-CH rebuild project over a three-year period, commencing in 2006. Figure 2.1-6 is the proposed in-service schedule. Construction would precede operational dates by one year. In summary, the following general construction completion periods are planned:

2007: Snowy Range Substation (115-kV facilities);
CH-MM transmission line, between Miracle Mile Substation and Snowy Range Substation;
2008: CH-MM transmission line between Snowy Range Substation and Cheyenne Substation;
2009: Modifications to Miracle Mile Substation;
Modifications to Cheyenne Substation;
Modifications to Ault Substation;
Modifications to Snowy Range Substation (230-kV facilities);
AU-CH transmission line

Transmission Construction

Construction activities for the proposed transmission systems and ground disturbances that would be associated with project construction activities are summarized in Table 2.1-2. During the 2006-2009 timeframe, Western anticipates that two to five crews, of 5 to 6 persons in size, would complete construction along the ROWs. Sequential activities for project construction would entail site clearing and grading, hauling, pole excavation and replacement, framing, conductor stringing and tensioning, and pole disposal/cleanup.

Table 2.1-2. Summary of Short-Term and Long-Term Surface Disturbance from 230-kV Transmission Line Construction

Project Component	Quantity (Number of Structures)	Short-Term Disturbance (Acres)	Long-Term Disturbance (Acres)
Cheyenne-Miracle Mile Rebuild Project			
H-frame structures	1017	152 acres	0.9 acre
Single pole structure sites	26	3.9 acres	0.02 acre
Conductor stringing sites	56	56 acres	N/A
Staging Areas	9	5 acres per each site (45)	N/A
Removal of Existing H-frame structures	1050	157	N/A
New Access Roads	N/A	N/A	N/A
Total		**414**	**0.9**
Ault-Cheyenne Rebuild Project			
H-frame structure sites	24	3.6 acres	0.02 acre
Single pole structure sites	166	24.7 acres	0.08 acre
Conductor stringing sites	13	13 acres	N/A
Staging Areas	2	5 acres each site (10)	N/A
Removal of Existing H-frame structures	240	36	N/A
New Access Roads	N/A	N/A	N/A
Total		**87**	**0.1**
Project Total		**501**	**1.02**

Notes: N/A: Not Applicable
Source: Western Area Power Administration

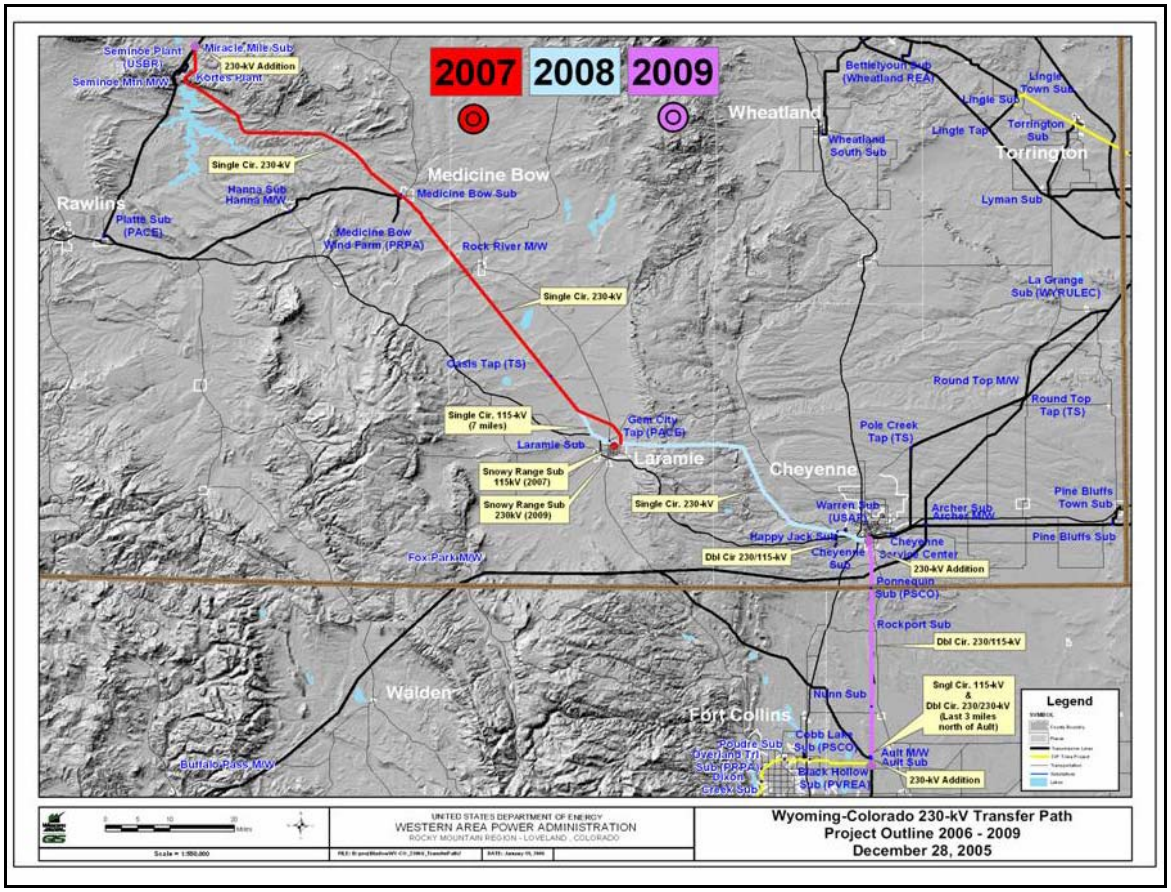

Figure 2.1-6 Proposed In-Service Schedule

Site Clearing and Grading – Standard construction procedures for transmission lines require the movement of vehicles and equipment within the ROW. All trees that may grow into the transmission line would be removed. Based on initial construction plans, Western expects that at each structure site, an area 105 feet by 105 feet surrounding the structure would be needed for construction. Additionally, some leveling of the ground surface may be needed to assure safe operation of equipment. This would be done only on areas of approximately 105 feet by 105 feet. Finally, disturbed areas would be scarified and left in a condition that would facilitate natural revegetation, provide for proper drainage, and prevent erosion.

Structure Excavation and Replacement – Holes would be augured for the new structures and no blasting would be required. Approximately 10 percent of each structure would be placed underground (e.g. a 70-foot tall structure would have approximately 7 feet underground). Erection crews would assemble new structures within the ROW, and crews would position structures into the augured holes using cranes. Dirt from the holes would be used to back fill around the new structures. Excess dirt would be scattered adjacent to the structure and leveled with existing topography. Existing structures would then be pulled and left in the ROW until removed for disposal.

Conductor Stringing and Tensioning – At specific stringing sites, special equipment needs to be set up to remove the old conductors and to pull in new ones. The conductors would be tensioned to a safe point above ground level, without becoming too taut during cold temperatures.

The fiberoptic overhead ground wire would be combined in one wire that would be installed in a similar manner.

Structure Disposal/Clean-up – Old structures would be removed and recycled and/or disposed per existing regulations. All associated hardware, including guying, guy rods, insulators, and conductor and overhead groundwire, would also be reused, recycled or disposed of as appropriate. If requested by a landowner, the old poles may be provided to the landowner for their use. Old structures would become the property of the construction contractor, who would be responsible for their disposal. Western would clean up and restore the ROW to pre-construction condition, to the extent possible.

Substation Construction

Miracle Mile, Cheyenne and Ault Substations – The installation of new and additional equipment at the existing Miracle Mile, Cheyenne and Ault Substations would take place within Western's substation facilities and properties. No new property would be required.

New Snowy Range Substation – The Snowy Range Substation would be constructed within property to be owned and maintained by Western. All construction would take place within an approximately 32 acre parcel that Western would acquire. The substation facility itself would be approximately 16 acres in size. Construction activities may disturb approximately 32 acres in total, including the substation area and the transmission line approaches. Construction of the 115-kV facilities would occur in 2007 followed by construction of 230-kV facilities in 2009.

2.1.8 Operation and Maintenance Practices

Electrical power system dispatchers at Western's Rocky Mountain Region, Power Marketing Operations Center would continue directing routine, daily operation of the transmission line. The dispatchers would use communication facilities to operate circuit breakers, which control the transfer of power through the lines. Because they operate automatically, the circuit breakers ensure safety in the event of a structure or conductor failure. Currently, aerial patrols of the line are conducted two or three times each year. Ground patrols are completed once a year, as weather permits. These patrols would continue as part of Western's routine maintenance program. Climbing inspections would also be conducted, with each structure being climbed and inspected every five years after construction following current maintenance procedures. In emergencies, prompt crew movement would be necessary to rapidly repair or replace damaged equipment.

2.1.9 Project Decommissioning Practices

At the end of the transmission line's useful life (50 to 60 years), if it were no longer required, the line and structures would be dismantled and removed from the ROW. Site reclamation would restore disturbed areas to as near pre-construction conditions as practicable.

2.1.10 Western's Standard Construction, Operation and Maintenance Practices

Western has adopted standard construction, operation and maintenance practices that would avoid and minimize impacts to the environment to the extent practicable. These measures are listed on Table 2.1-3 and include Western's Standard Construction and Mitigation Practices and Special Measures implemented for this Project. In addition, Western would implement Western's Integrated Vegetation Management Guidance Manual and the BLM's Best Management Practices (BMPs). These measures would be used to control and reestablish vegetation within the ROW

and at substation sites. These measures are part of Western's proposed project and are considered in the EA impact assessments.

Table 2.1-3. Proposed Project Construction and Mitigation Measures

Western's Standard Construction and Mitigation Practices	
1.	The contractor shall limit the movement of crews and equipment to the ROW, including access routes. The contractor shall limit movement on the ROW to minimize damage to residential yards, grazing land, crops, orchards, and property, and shall avoid marring the lands. The contractor shall coordinate with the landowners to avoid impacting the normal function of irrigation devices during project construction and operation.
2.	When weather and ground conditions permit, the contractor shall obliterate all construction-caused deep ruts that are hazardous to farming operations and to movement of equipment. Such ruts shall be leveled, filled and graded, or otherwise eliminated in an approved manner. Ruts, scars, and compacted soils in hay meadows, alfalfa fields, pastures, and cultivated productive lands shall have the soil loosened and leveled by scarifying, harrowing, discing, or other approved methods. Damage to ditches, tile drains, terraces, roads, and other features of the land shall be corrected. At the end of each construction season and before final acceptance of the work in these agricultural areas, all ruts shall be obliterated, and all trails and areas that are hard-packed as a result of construction operations shall be loosened and leveled. The land and facilities shall be restored as nearly as practicable to the original condition.
3.	Water turnoff bars or small terraces shall be constructed across all ROW trails on hillsides to prevent water erosion and to facilitate natural revegetation on the trails.
4.	The contractor shall comply with all federal, state, and local environmental laws, orders and regulations. Prior to construction, all supervisory construction personnel will be instructed on the protection of cultural and ecological resources. To assist in this effort, the construction contract will address: a) federal and state laws regarding antiquities and plants and wildlife, including collection and removal; and b) the importance of these resources and the purpose and necessity of protecting them.
5.	The contractor shall exercise care to preserve the natural landscape and shall conduct his construction operations so as to prevent any unnecessary destruction, scarring, or defacing of the natural surroundings in the vicinity of the work. Except where clearing is required for permanent works, approved construction roads, or excavation operations, vegetation shall be preserved and shall be protected from damage by the contractor's construction operations and equipment.
6.	On completion of the work, all work areas except access trails shall be scarified or left in a condition that will facilitate natural revegetation, provide for proper drainage, and prevent erosion. All destruction, scarring, damage, or defacing of the landscape resulting from the contractor's operations shall be repaired by the contractor.
7.	Construction trails not required for maintenance access shall be restored to the original contour and made impassable to vehicular traffic. The surfaces of such construction trails shall be scarified as needed to provide a condition that will facilitate natural revegetation, provide for proper drainage, and prevent erosion.
8.	Construction staging areas shall be located and arranged in a manner to preserve trees and vegetation to the maximum practicable extent. On abandonment, all storage and construction materials and debris shall be removed from the site. The area shall be regraded, as required, so that all surfaces drain naturally, blend with the natural terrain, and are left in a condition that will facilitate natural revegetation, provide for proper drainage, and prevent erosion.
9.	Borrow pits shall be so excavated that water will not collect and stand therein. Before being abandoned, the sides of borrow pits shall be brought to stable slopes, with slope intersections shaped to carry the natural contour of adjacent, undisturbed terrain into the pit or borrow area, giving a natural appearance. Waste piles shall be shaped to provide a natural appearance.
10.	Construction activities shall be performed by methods that prevent entrance or accidental spillage of solid matter, contaminants, debris, and other objectionable pollutants and wastes into flowing streams or dry water courses, lakes, and underground water sources. A buffer zone of 500 ft from live waters and wetlands and 75 ft from ephemeral channels would be established in areas where staging, stockpiling, and refueling occur. Such pollutants and wastes include, but are not restricted to, refuse, garbage, cement, concrete, sanitary waste, industrial waste, radioactive substances, oil and other petroleum products, aggregate processing tailings, mineral salts, and thermal pollution.

Table 2.1-3. Proposed Project Construction and Mitigation Measures

11.	Dewatering work for structure foundations or earthwork operations adjacent to, or encroaching on, streams or water courses will not be performed without prior approval from appropriate state agencies. A buffer zone of 500 ft from live waters and wetlands and 75 ft from ephemeral channels will be established in areas where staging, stockpiling, and refueling occur.
12.	Excavated material or other construction materials shall not be stockpiled or deposited near or on stream banks, lake shorelines, or other water course perimeters where they can be washed away by high water or storm runoff or can in any way encroach upon the actual water source itself. A buffer zone of 500 ft from live waters and wetlands and 75 ft from ephemeral channels will be established in areas where staging, stockpiling, and refueling occur.
13.	Waste waters from construction operations shall not enter streams, water courses, or other surface waters without use of such turbidity control methods as settling ponds, gravel-filter entrapment dikes, approved flocculating processes that are not harmful to fish, recirculation systems for washing of aggregates, or other approved methods. Any such waste waters discharged into surface waters shall be essentially free to settleable material. Settleable material is defined as that material that will settle from the water by gravity during a 1-hour quiescent period.
14.	The contractor shall utilize such practicable methods and devices as are reasonably available to control, prevent, and otherwise minimize atmospheric emissions or discharges of air contaminants.
15.	Equipment and vehicles that show excessive emissions of exhaust gases due to poor engine adjustments, or other inefficient operating conditions, shall not be operated until corrective repairs or adjustments are made.
16.	Burning or burying of waste materials on the ROW or at the construction site will not be allowed. The contractor shall remove all waste materials from the construction area. All materials resulting from the contractor's clearing operations shall be removed from the ROW.
17.	The contractor shall make all necessary provisions in conformance with safety requirements for maintaining the flow of public traffic and shall conduct his construction operations so as to offer the least possible obstruction and inconvenience to public traffic.
18.	Western will apply necessary mitigation to eliminate problems of induced currents and voltages onto conductive objects sharing a ROW to the mutual satisfaction of the parties involved. Western will install fence grounds on all fences that cross or are parallel to the proposed line.
19.	The contractor will span riparian areas located along the ROW and avoid physical disturbance to riparian vegetation. Equipment and vehicles will not cross riparian areas on the ROW during construction and operation activities. A buffer zone of 500 ft from live waters and wetlands and 75 ft from ephemeral channels will be established in areas where staging, stockpiling, and refueling occur. Existing bridges or fords will be used to access the ROW on either side of riparian areas.
20.	ROW would be purchased at fair market value and payment would be made of full value for crop damages or other property damage during construction or maintenance.
Western's Project Specific Measures for the CH-MM and AU-CH Transmission Line Rebuild Project	
21.	On the CH-MM portion of the project, construction would not occur within pronghorn, mule deer, or elk crucial winter range between November 15 and April 30 on all public and private lands unless an exception is granted by the BLM. Western would also avoid construction in greater sage-grouse nesting habitat during the nesting season.
22.	Until Preble's meadow jumping mouse is delisted, Western would conduct an inventory prior to construction to determine if any existing structures occur in potential Preble's habitat; these structures would be cut off at ground level to avoid disturbing Preble's habitat.
23.	Western would survey all areas to be disturbed and possible traffic ways for Ute ladies'-tresses, during the appropriate time of year when the orchid is in flower and, if any are found, would consult with the FWS to determine what actions are necessary to avoid or minimize impacts to Ute ladies'-tresses. During operations, traffic in potential Ute ladies'-tresses habitat would be restricted to existing roads.

Table 2.1-3. Proposed Project Construction and Mitigation Measures

<table>
<tr><td>24.</td><td>Western would minimize the introduction and/or spread of weeds by washing all equipment at a commercial facility prior to the start of construction each year, by avoiding vehicle traffic in known weedy areas, and by rewashing equipment if weeds are encountered. Western would reclaim all disturbed areas as soon as practical after construction each year and would implement a weed control program (in consultation with the BLM and private landowners) if the project causes the spread of weeds.</td></tr>
<tr><td>25.</td><td>On the AU-CH portion, Western would avoid construction in pronghorn winter ranges during critical winter periods, to be determined in consultation with the Colorado Division of Wildlife prior to construction each year.</td></tr>
<tr><td>26.</td><td>Western would span all 3.5 miles of known Colorado butterflyplant habitat along the ROW and would limit traffic to existing roads. Operations traffic in known or potential Colorado butterflyplant habitat would also be restricted to existing roads.</td></tr>
<tr><td>27.</td><td>If construction in floodplains and wetlands were to cause soil compaction or ruts, long-term impacts to wetland vegetation could occur. To avoid this impact, Western would limit construction in floodplains and wetlands to periods when soils are dry or frozen and/or use measures to support construction equipment (e.g., oversized treads on equipment, tracked equipment, matting) to avoid compacting soils and creating ruts. A buffer zone of 500 ft from live waters and wetlands and 75 ft from ephemeral channels would be established in areas where staging, stockpiling, and refueling occur.</td></tr>
<tr><td>28.</td><td>If construction is to occur in potential mountain plover habitat during the breeding and nesting season, Western would survey potential habitat for the presence or absence of mountain plover nests and would avoid construction within 0.25 mile of nest sites until 37 days after the nest is discovered or 7 days post-hatching.</td></tr>
<tr><td>29.</td><td>Removal of the existing wooden transmission line structures on eligible cultural sites shall be accomplished by cutting the structures at ground surface, thus requiring no additional excavation of the surrounding area. The structures shall be accessed using rubber-tire vehicles to minimize other associated impacts to the site. All structure removals shall be monitored by a permitted archaeologist. This measure applies to four structures listed below, and will minimize adverse effects caused by structure removal as much as possible.
<table>
<tr><th>Site Number</th><th>Site Type</th><th>Owner</th><th>Structure to be removed</th></tr>
<tr><td>5WL2622</td><td>Historic homestead</td><td>Private</td><td>58-4</td></tr>
<tr><td>5WL4830</td><td>Prehistoric tipi rings</td><td>Private</td><td>57-2</td></tr>
<tr><td>48AB1405</td><td>Prehistoric</td><td>Private</td><td>71-4</td></tr>
<tr><td>48CR8033</td><td>Prehistoric</td><td>Private</td><td>27-2</td></tr>
</table></td></tr>
<tr><td>30.</td><td>Impacts to eligible cultural sites caused by construction of new towers shall be minimized by planning. Whenever possible, transmission structures will be planned outside of site boundaries. In cases where avoidance is not possible, a mitigation plan will be formulated. If new structures are planned within 150 feet of a site, an archaeological monitor will be present to ensure that the site is not impacted during structure construction.</td></tr>
<tr><td>31.</td><td>Heavy trucks and other equipment should not cross eligible cultural sites when unimproved access roads are wet. Upgrading or maintenance of access roads within the boundaries of eligible sites should be avoided wherever possible. Where avoidance is not possible, a mitigation plan should be prepared and implemented prior to any construction or roadwork. The plan should include mitigation of adverse effects. These guidelines apply not only to roads surveyed as project access roads, but also to roads beneath the transmission lines that were subsumed in the transmission line survey.</td></tr>
<tr><td>32.</td><td>The contractor shall receive instructions from Western regarding the potential presence of fossils in pole excavations and in areas excavated or disturbed for roadwork. The contractor will be notified of his obligation to report any suspected paleontologic finds to Western. Western will retain a paleontologist to assess the significance of the paleontological finds and make recommendations. The BLM maintains staff paleontologists to perform assessments of discoveries on lands managed by them.</td></tr>
</table>

Table 2.1-3. Proposed Project Construction and Mitigation Measures

33.	Western would design and construct the transmission line in conformance with *Suggested Practices for Protection of Raptors on Powerlines: the State of the Art in 1996* (Avian Power Line Interaction Committee, 1996) to eliminate the potential for raptor electrocution. Western would install bird flight diverters at the Rock Creek crossing on both the rebuilt CH-MM transmission line and the existing HJ-MM transmission line to mitigate the potential for future raptor collisions at the Rock Creek crossing.
34.	The 230-kV single pole steel structures proposed along CH-MM Section 5 and AU-CH Section 1 and Section 2 will be a neutral non-reflective steel material. Non-reflective and compatibly toned conductors and insulators will also be used in urban settings. Corten steel is not recommended in these settings due to the strong contrasts that the darker steel tone would create in these open settings.
35.	In the event any threatened, endangered, candidate or proposed species are found during construction of the proposed CH-MM and AU-CH transmission line, project-specific surface disturbance shall be halted and the USFWS will be notified immediately. Section 7 consultation between Western and USFWS will be re-initiated prior to restarting construction activities in the specific area.
36.	To minimize impacts to nesting bald eagles, Western will conduct surveys prior to the initiation of construction-related activities within 1.0 mile of the construction corridor. No construction-related activities shall occur within 1.0 mile of any active bald eagle nest from February 1 though July 31. If the nest is determined to be active, Western will immediately notify the USFWS and a raptor mitigation plan will be developed and implemented with the concurrence of the USFWS, the BLM, and the Wyoming Game and Fish Department (WGFD).
37.	Only those trees, tree tops, and limbs that are deemed to pose a hazard to operation and maintenance of the power line will be removed. Western would minimize tree clearing, topping, and limb clearing, and these activities would only occur within the authorized ROW.

Source: Western Area Power Administration, 2004.

THIS PAGE LEFT INTENTIONALLY BLANK

2.2 Alternatives to the Proposed Project

2.2.1 Alternatives Considered and Eliminated from Detailed Study

Western considered design and voltage alternatives to the proposed project. Alternatives considered and eliminated for the CH-MM rebuild include:

- Reconductoring the existing 115-kV line
- Constructing a new 115-kV line on wood H-frame or light duty steel H-frame structures
- Constructing a new 115/230-kV line on light duty steel H-frame, lattice steel or single pole steel structures

For the AU-CH rebuild, the following alternative was considered:

- Constructing a new 115-kV line on wood H-frame or light duty steel structures

All of these system design and voltage alternatives were eliminated since they do not meet Western's purpose and need, with the exception of the light duty steel H-frame, single pole steel or the lattice steel alternative. None of these alternatives would provide the benefit of increasing the TOT3 transfer capability by an additional 75 MW. Light duty steel H-frame, single pole steel and lattice steel structures were eliminated based on costs.

2.2.2 Routing and Realignment Alternatives

The following routing and realignment alternatives have been considered. Localized routing alternatives include:

CH-MM Alternative Route 1 – CH-MM Alternative Route 1 is approximately 16.2 miles long, located north and west of Laramie, Wyoming, and is divided into two parts, A and B. Figure 2.2-1 illustrates an overview of CH-MM Alternative Route 1.

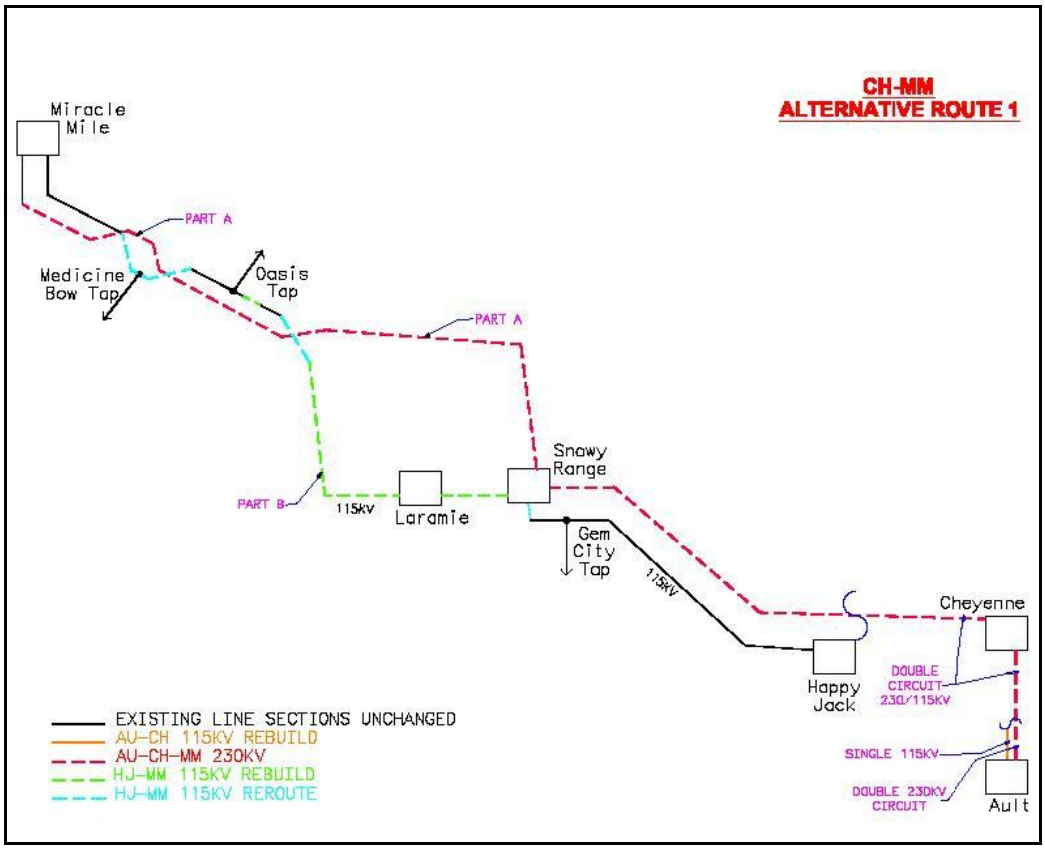

Figure 2.2-1 CH-MM Alternative Route 1

The alternative would diverge from the proposed project as follows:

MP 40 to MP 91 (Figure 2.2-2) – This segment includes the swap of the CH-MM and HJ-MM line sections near the Medicine Bow Tap (MP 47), to continue connection of the Medicine Bow Tap to the remaining HJ-MM 115-kV line. The existing HJ-MM line section would be rerouted onto the original CH-MM ROW and the new CH-MM 230-kV line would be rerouted onto the HJ-MM ROW (also shown in Appendix A, Exhibit A-Alt.1-1). This line swap would be more of an operational change rather than new construction of the transmission line; however, there would be land disturbance where the lines are swapped. The operational changes are required to mitigate or reduce service disruptions to customers that would result from transmission line outages.

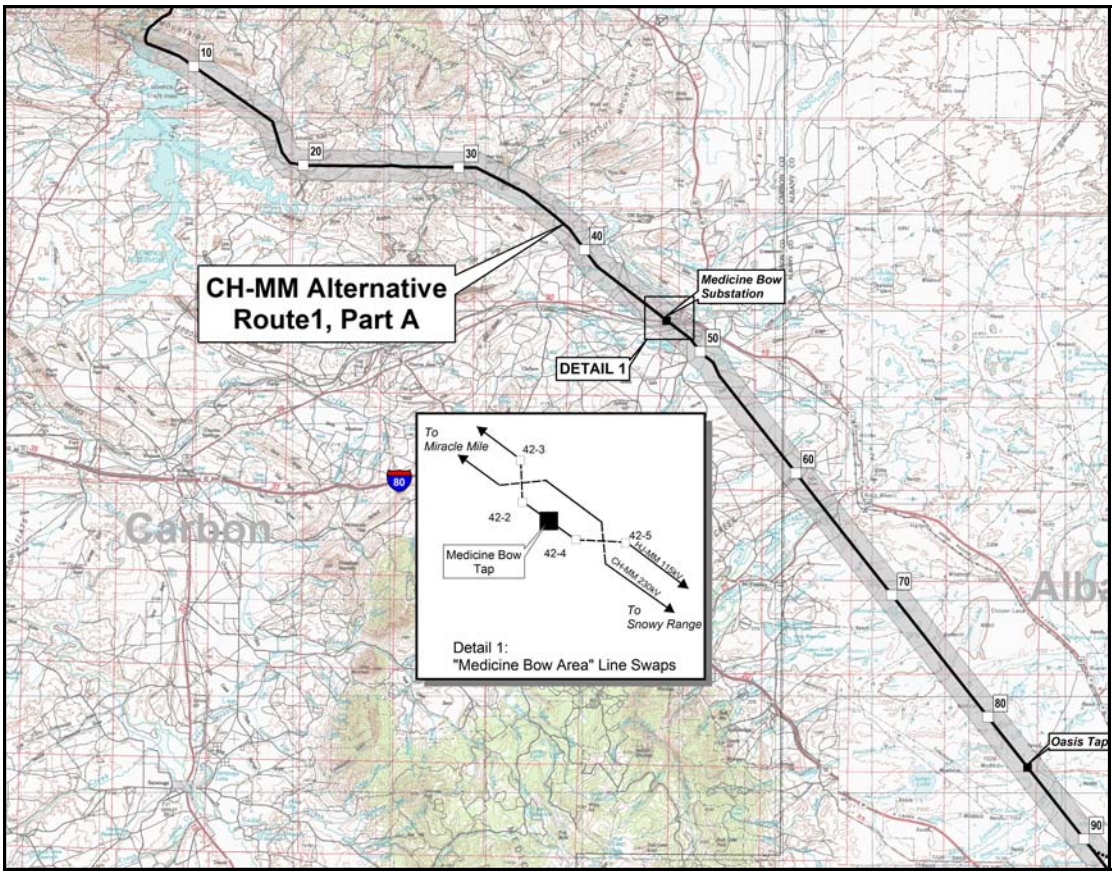

Figure 2.2-2 CH-MM Alternative Route 1 - Medicine Bow Swap

MP 91 to MP 100 (Figure 2.2-3) – This segment includes CH-MM Alternative Route 1, Parts A and B. Part A would be identified as the 230-kV wood H-frame structure rebuild north of Laramie from MP 91 to MP 100 on existing HJ-MM ROW. The remainder of CH-MM Alternative Route 1, Part B would be the swap of the CH-MM and HJ-MM lines near MP 91 to construct the new 230-kV line on the HJ-MM ROW and to rebuild a portion of the HJ-MM line on the original CH-MM line section from MP 91 to the Laramie Substation. This portion of the HJ-MM line construction on the original CH-MM line section would consist of 115-kV single circuit wood H-frame, except from approximately MP 97 to MP 99 where single circuit single pole steel structure construction occurs (also shown in Appendix A, Exhibit A-Alt.1-2). Part A is scheduled to be constructed in 2007 and Part B in 2008.

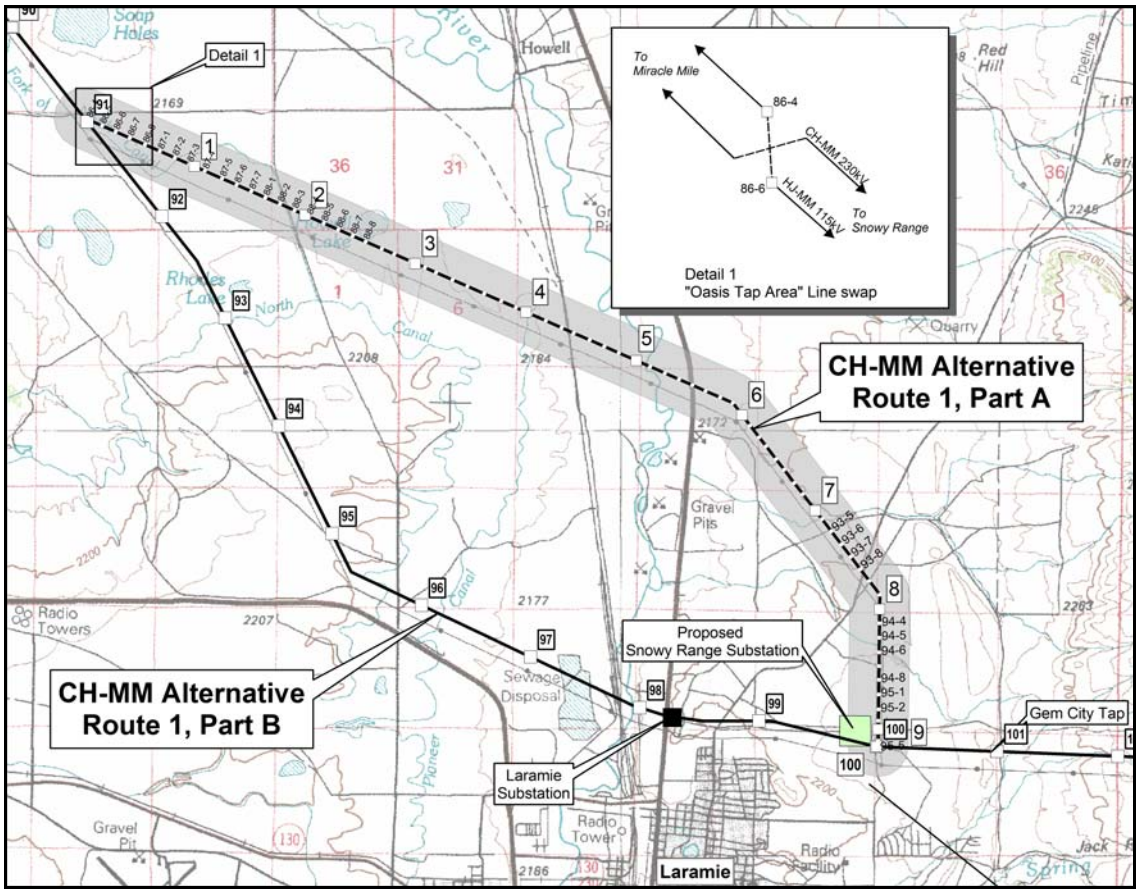

Figure 2.2-3 CH-MM Alternative Route 1 - Parts A and B

The following paragraph describes the proposed transmission structure design of the single circuit single pole steel structure along Part B of CH-MM Alternative Route 1.

115-kV Single Circuit Single Pole Steel Structures on the HJ-MM line – For CH-MM Alternative Route 1, Part B, Western is proposing installing single circuit single pole steel structures along approximately two miles of the re-routed HJ-MM line (MP 97 to MP 99). The single pole steel structures would be approximately 82 feet in height, compared to 52 feet for the average height of the existing H-frame structures. The normal span length between the single pole steel structures would be 800-900 feet, compared to 700 to 800 feet for the existing 115-kV wood H-frame structures. At the crossing of the Little Laramie River and US Highway 287, the single pole steel structures may need to be taller to provide adequate clearances. Maximum heights for the single circuit single pole steel structures for the proposed alternative at the crossings are estimated to be approximately 100 feet. Figure 2.2-4 illustrates the proposed 115-kV single pole steel structure.

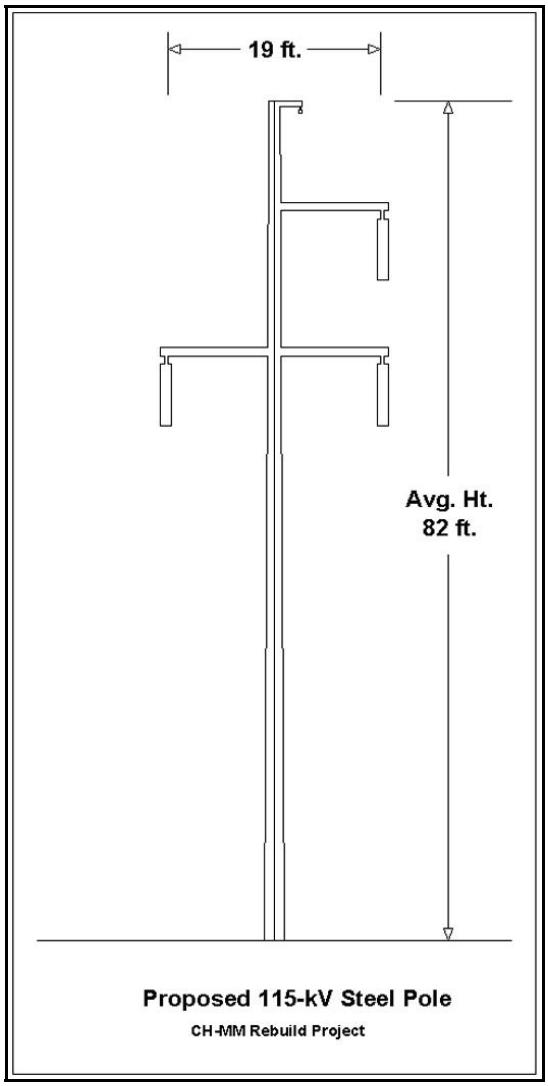

Figure 2.2-4 115-kV Single Circuit Single Pole Steel Structures

Table 2.2-1 summarizes the proposed system design and ROW requirements of all three single circuit structures proposed to be built along CH-MM Alternative Route 1, Parts A and B.

Table 2.2-1. Typical Transmission Design – New Single Circuit Structures, Cheyenne-Miracle Mile Alternative Route 1

Description	**230-kV H-frame Structures Part A (CH-MM)**	**115-kV H-Frame Structures Part B (HJ-MM)**	**115-kV Single Pole Steel Structures Part B (HJ-MM)**
Right-of-Way Width	105 feet	70 feet	70 feet
Span between Structures (average)	700-800 feet	700-800 feet	800-900 feet
Span between Structures (maximum)	1050 feet	875 feet	1,200 feet
Number of Structures p/mile (average)	7.5	7.5	5.2
Height of Structures (average)	70 feet	52 feet	82 feet
Height of Structures (typical range)	65-83 sq. feet	52-55	75-90 feet
Structure base area (square feet)	37.5 sq. ft.	22.5 sq. ft.	12 sq. ft.
Land disturbed by construction at each structure base (maximum square feet)	6,500 heavy disturbance 16,000 light disturbance	6,500 heavy disturbance 16,000 light disturbance	6,500 heavy disturbance 16,000 light disturbance
Miles of line per conductor stringing site	2-3 miles	2-3 miles	2-3 miles
Land disturbed at each stringing site	1 acre 105 x 105 feet	1 acre 105 x 105 feet	1 acre 105 x 105 feet
Conductor type and size (circular mils)	ACSR (1,272,000)	ACSR (795,000)	ACSR (795,000)
Circuit Configuration	Horizontal	Horizontal	Vertical
Minimum ground clearance beneath conductors	25 feet	25 feet	25 feet

Source: Western Area Power Administration

Construction activities for the proposed transmission systems and ground disturbances that would be associated with project construction of the entirety of CH-MM Alternative Route 1 and AU-CH Transmission Line Rebuild Project are summarized in Table 2.2-2.

Table 2.2-2. Summary of Short-Term and Long-Term Surface Disturbance from CH-MM Alternative Route 1 Transmission Line Construction and AU-CH Transmission Line Rebuild Project (Entire Route)

Project Component	Quantity (Number of Structures)	Short-Term Disturbance (Acres)	Long-Term Disturbance (Acres)
Cheyenne-Miracle Mile Rebuild Project with Alternative 1 Part A and Part B			
230-kV H-frame structures	1031	154 acres	0.9 acres
115-kV H-frame structure sites	38	6	0.02 acres
115-kV single pole steel structure sites	10	1.5	0.003 acres
230-kV double circuit single pole steel structure	26	3.9	0.02
Conductor stringing sites	59	59	N/A
Staging Areas	9	45	N/A
Removal of Existing H-frame structures	1130	169	N/A
New Access Roads	N/A	N/A	N/A
Total		**438**	**0.9**
Ault-Cheyenne Rebuild Project			
H-frame structure sites	24	3.6 acres	0.02 acre
Single pole steel structure sites	166	24.7 acres	0.08 acre
Conductor stringing sites	13	13 acres	N/A
Staging Areas	2	5 acres each site	N/A
Removal of Existing H-frame structures	240	36	N/A
New Access Roads	N/A	N/A	N/A
Total		**87**	**0.1**
Project Total		**525**	**1**

Notes: N/A: Not Applicable
Source: Western Area Power Administration

Appendix A of the EA contains detailed maps of the CH-MM Alternative Route 1 location, including the mileposts (MPs) referenced above. Typical cross-sections of the existing and proposed transmission designs and ROWs are contained in Appendix A, Exhibit A- Alt. 1-1, Exhibit A - Alt. 1-2, and Figure A – Alt. 1-1. Table A - Alt. 1-1 shows a summary of short-term and long-term surface disturbance and the total number of structures by type for the CH-MM Alternative Route 1 alone.

AU-CH Alternative Route 2 – AU-CH Alternative Route 2 consists of localized realignments of the proposed project between MPs 17 and 32.5, where Western's AU-CH and ARH-AU transmission lines are intermittently located east and west of rural homes and buildings, respectively (Figure 2.2-5). Under this alternative, the AU-CH line would be located adjacent and parallel to the existing ARH-AU transmission line.

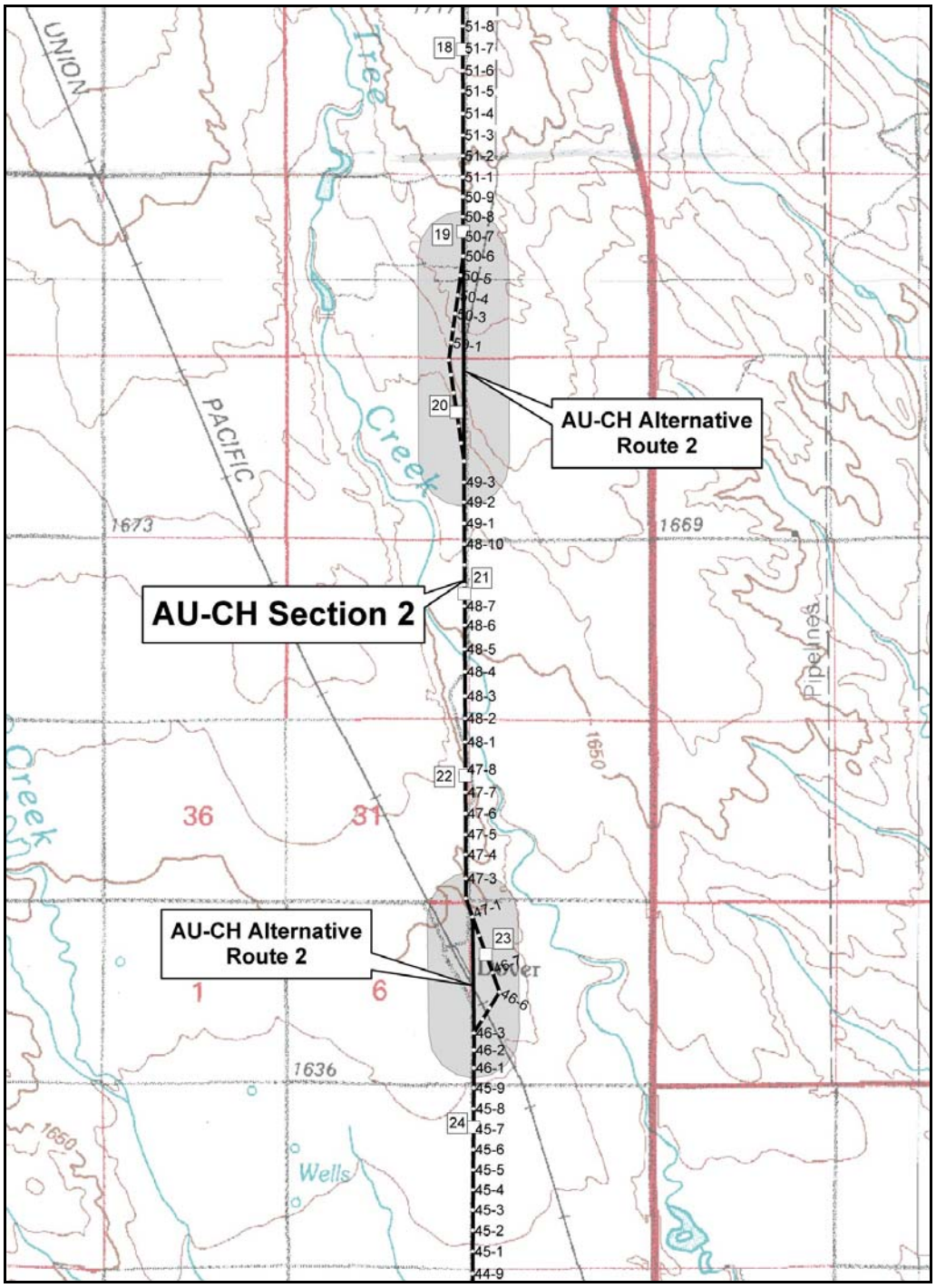

Figure 2.2-5 AU-CH Alternative Route 2

2.2.3 No Action Alternative

Under the No Action Alternative, Western would not rebuild or upgrade the existing CH-MM and AU-CH transmission lines or substation facilities. Maintenance issues on the CH-MM line would

increase, and the line would become difficult to maintain in service beyond 5-8 years, given its age and deteriorating condition. As a result, reliability problems would become more frequent, as well as the frequency of repairs, as the line continues to age. The No Action Alternative would also result in no benefits to the TOT3 transfer capability. Consequently, this alternative would not fill Western's stated purpose and need for the proposed project.

THIS PAGE LEFT INTENTIONALLY BLANK